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ROLE OF ACTINOTHERAPY IN THE GASTROINTESTINAL DISTURBANCES OF CHILDREN

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Introduction

Ultraviolet ray is a weapon of great precision and force in the armamentarium of a physician to fight against the gastro-intestinal disturbances amongst infants and children in India. I am using the agent for the purpose for more than twelve years with astonishing result and am convinced of its great value. The properties of ultraviolet rays are well known to ray-therapeutists but the scientific explanation of their application to the gastrointestinal troubles in children is rare in medical literature and is not to be found even in the standard books on the subject.

The vicious circle in gastrointestinal diseases—The gastro-intestinal disease is an eternal scourge of child life. The causes of and sequelæ to them so operate that a vicious circle is created the elimination of which taxes the skill of the practitioner to the utmost. A cause produces inflamed mucous membrane of the stomach and intestines which needs rest. This requires restriction of food which causes a stage of starvation and malnutrition that lowers resistance and recuperative powers and the trouble increases day by day. If we succeed in breaking this vicious circle, the child is saved; otherwise, we are faced with what we see with pain in the vital statistics year after year.

The value of actinotherapy in breaking this vicious circle—It is in the breaking of this vicious circle or the damaging chain of clinical events that actinotherapy, when pressed in service, responds marvellously and gives so much better results than what ordinary medical and dietetic treatments alone could do. The management of gastrointestinal diseases does not end at the removal of the cause but requires adequate aid to combat the general disturbance produced by it in the whole body mechanism. It is, for instance, well known that infective gastro-enteritis of acute nature developing on a subacute or chronic enteritis even when cured by judicious handling of the child, would end fatally due to general exhaustion which leads to failure of normal digestive functions and intercurrent catarrh of the respiratory passages; but, if ultraviolet rays are put in action to conserve the vitality, this end may be averted and the child saved.

Limitations of Actinotherapy

It should be borne in mind that ultraviolet rays, in most of the cases, help to combat the existing condition and, in some cases, aid in the removal of the cause as well; but it would be expecting too much from them, for instance, if, while combating the effects on the system of the protein deficiency in diet, ultraviolet rays should provide the supply of it as well or, once they have helped in neutralizing the acidosis produced by intestinal toxæmia and aided in eliminating the waste products and toxins, they should also check further troubles, inspite of the cause persisting. We should keep in mind that when an ultraviolet ray acts, it neither adds to nor subtracts anything from the body. It simply brings into action the defensive powers of the system which might have been paralyzed by the diseased condition of the patient. It is our duty in such cases to supply the necessary material not existing in the body which could be pressed into use for the benefit of the system by the great activator and stimulant—the ultraviolet ray.

Rationale of Actinotherapy an Gastrointestinal Diseases

The known properties of ultraviolet rays and the rationale of their application to the conditions that exist in a child showing

mild or severe disturbances of the gastrointestinal tract, are detailed below:—

Ultraviolet rays activate cholesterol or provitamin D—All growing tissues have cholesterol which when activated plays an important part in metabolism. This vitamin D formation by the tissues under the influence of ultraviolet rays is a process of great importance. The very first sign of vitamin D deficiency in a child invariably occurs in the digestive system. Constipation initially and then alternating with diarrhœa producing offensive stools containing mucus and undigested food recurring at variable intervals becomes the feature of such a child's life. Treatment with salines, bismuth salts, chalk powders, astringents and opiates appear to succeed at times but actually makes the matter worse till some doctor unwillingly gives cod liver oil, ostelin or adexolin not to meet vitamin D deficiency but as a tonic. Two things now occur. If the case is mild, cod liver oil is digested and absorbed and the patient improves but when the gastrointestinal mucous membrane is too irritated cod liver oil upsets the digestion and makes the matters worse. It is in such obstinate cases that ultraviolet ray therapy shows its superiority over other methods of treatment.

An illustrative case will explain the point under discussion:

Case 1—An Anglo-Indian female child aged 2 years had indigestion, constipation and then looseness of bowels. She had four attacks of diarrhœa in a few months. The last attack was very severe. She became very thin and emaciated. The doctors and a civil surgeon who tried almost everything gave her up for lost. When I examined the child she was not able to retain even water which with the powders given by a doctor was passed out unchanged with the motion. Her gums were swollen and I could detect prerachitic signs as well. There was no question of giving drugs and cod liver oil in any form by mouth. All medicines were stopped. She was given two teaspoonfuls of thin rice water with 2 drops of brandy every 2 hours and ultraviolet general body exposures starting with 2 minutes at 36 inches twice a week. Her temperature which was 101°F. became 99°F. and she had only 3 stools after the 2nd exposure. She felt hungry and looked very bright after the 4th exposure. There was no diarrhœa or any other gastrointestinal symptom after the 6th exposure. She gained 2 lbs. 3 ozs. in three weeks and altogether 4 lbs. and 2 ozs. after a course of 12 exposures in 6 weeks. She was then fit to be treated with calcium, cod liver oil and correct feeding by mouth. Ultraviolet ray actually saved her life.

Ultraviolet rays help the absorption and fixation of calcium, iron and iodine—Calcium is a vital constituent of every living cell. There could be no cell life without calcium. The absorption of calcium is linked up with phosphorus and potassium and other alkalis and depends on the presence of sufficient quantity of vitamin D in the system. Gastrointestinal disturbances do not only restrict the supply of calcium and other salts but also hinder their assimilation. The balance of calcium and potassium ions in the tissues is thus destroyed and the calcium content of blood is lowered. This explains the predisposition to asthenia, hypotonias, malnutrition, marasmus and convulsions met with in cases of gastrointestinal troubles. This deficiency of alkali reserve combined with a continual increase in acid formation caused by fermentative processes in the intestine due to gastroenteritis and other bowel complaints also produces a state of chronic alkali shortage and leads to acidosis so common in gastrointestinal disturbances. Calcium-phosphorus supply in such cases, therefore, becomes imperative not only to avoid dangerous asthenia and exhaustion but acidosis as well. The intake of calicum, in however big quantities it may be, does not correct the calcium deficiency. It is the assimilation and retention of these salts which are required which depend on a sufficiency of vitamin D and activation of the parathyroid, suprarenal and other endocrine glands which are known as "calcium builders". It is now well known that when skin receives ultraviolet rays, assimilation and absorption of calcium from food and drug and stimulation of endocrine glands and activation of ergosterol occur which guarantee the cell fixation and retention of calcium-phosphorus salts which do not only protect the living tissue cells from destruction but also protect them from baneful effects of acidosis by preserving the integrity of the alkali reserve. Thus, we see that when a child's power of absorption and assimilation is so disturbed by a gastrointestinal trouble that he has no hope to get help from his food and drugs, ultraviolet ray with calcium and vitamin D injections comes to his aid and soon enables him to receive benefit from his diet and medicine. Calcium therapy with suitable diet that give an excess of alkaline end products are all that are required later on.

The following case will illustrate the point very clearly:

Case 2—A male child, 3 years of age, in a Judge's family had repeated attacks of gastroenteritis causing great concern. The local doctors were tired of treating his digestive disturbances. I saw the case in a severe acute attack. Stools were with mucus and blood, ankles and face swollen, hæmic murmur present, 3 years' child weighed 13 lbs. I examined his elder brother and sister and found signs of rickets and avitaminosis. He was put on saline and ultraviolet rays. Child slept well after first exposure, felt bright after 3rd and was alright after 7th exposure. He gained 3 lbs. in 3 weeks. The course of ultraviolet rays was not completed. After full one year, he again got an atack of gastroenteritis and as I was on 2 months' leave he was treated by my assistant on exactly the same lines as I did a year ago minus ultraviolet rays. The child got bad to worse. I returned and found his weight the same 16 lbs. as it was a year ago after the 1st treatment. He was given exposures of ultraviolet rays. His stools were formed after the 4th exposure and he was alright after the 6th. His weight remained stationary this time even after the course. I ordered collosal calcium with vitamin D and ostelin (Glaxo) ½ c.c. twice a week for 3 months and he shot up from 16 lbs. to 24 lbs. in a year. Extra supply of calcium with vitamin D became necessary as the body lacked the quantity and as I have remarked before that ultraviolet rays cannot produce things in the body if they are not there in any form whatsoever.

Ultraviolet rays help in stabilization of metabolism—The ultraviolet ray bring metabolic processes to normal whether they are above or below the level. When nutrition is at fault the effect is to increase the absorption but when elimination is defec-

tive an increased burning up of waste products is brought about. In gastrointestinal troubles the metabolic balance breaks down and the absorption, cell-fixation and elimination of organic and inorganic substances proceed on abnormal levels. Let me explain the point with reference to metabolism of fat in cases of gastrointestinal troubles. Healthy infants need 3 per cent and not more than 4 per cent of fat in their diet. If this amount is not available the body heat cannot be maintained which results in abdominal chills and repeated attacks of diarrhœa and gastro-intestinal catarrh which at last ends in rickets, but this amount cannot be given to a child whose digestion is upset and who may already be suffering from malnutrition or recovering from an attack of acute gastrointestinal catarrh. This normal and necessary amount of fat to such a patient produces 'fat-intoxication' which brings about a fresh attack of flatulence, diarrhœa, vomiting and convulsions or in worst cases signs of intestinal obstruction. I have seen doctors mistaking it even for meningitis. This proves fatal if bowels are not cleared at once and the excessive fat not used up by some means. A vicious circle is thus created. The deficiency of fat causes prerachitic condition and predisposes to "chills" with resulting "catarrh" while sufficient amount of fat produces "fat intoxication" which in its turn produces violent intestinal derangement. The child's life hangs between the devil and the deep sea. Bring the ultraviolet ray on the scene and you would be amazed to see how it meets the situation. It would increase absorption and assimilation, help elimination and burning up of the excess of fat, if any, and also look after the abnormal fluctuations of body heat. I have records of very impressive cases but interesting and instructive though they are I refrain from giving any more case-reports in order to economize in space.

Ultraviolet rays produce thermal stability—The ultraviolet ray balances the production of tyrosine and cystine in the epidermis and thus controls the thermal mechanism of body surface. The importance of heat regulation in the causation and treatment of gastrointestinal diseases in children is well recognized by all pediatrician. The so-called ordinary "chill" assumes a great importance in the case of infants and children and is due to thermal instability either acquired temporarily or inherited and inborn as in a rheumatic child. A child has relatively great body surface and consequently excessive loss of heat from it. If this is not compensated by an equal production of heat the legs get abnormally cooled. The blood returning from them reaches the inferior vena cava at a lower temperature and cools the abdominal viscera with resulting catarrh of the mucous membrane of the whole digestive tract. This either starts gastroenteritis or makes it worse if it is already there. The restriction of food and disturbed fat metabolism existing in such cases also act unfavourably. Directions are given by physicians to keep the child warm and its legs and abdomen flannelled. This provision of heat from external sources has proved its worth but ultraviolet rays, as we have seen, attain the same object by maintaining the balance of heat production and loss through its action on metabolism and epidermis. The value of it could be well judged in a case where hot water bottles and flannels fail to do their work.

Ultraviolet rays increase all the constituents of blood and lymph supply—The ultraviolet ray is a great roborant and one of the most efficient tonic known to us. The efficiency with which it prevents anæmia and its sequelæ during the course of disturbed feeding and digestion and the rapidity of its action to restore the quality of impoverished blood are simply amazing. The great pallor noticed in all severe cases of gastro-enteritis is due to decline of red blood corpuscles and deficiency of hæmoglobin. The direct interference with nutrition resulting from the disordered condition of the intestinal glands, the large amount of fluid and mucus discharge thrown out of intestinal track do not only exhaust and weaken the patient but leave the blood vessels half-full causing the failure of circulation and consequent œdema and this, combined with enforced want of combustible food, leads to fatal end. The ultraviolet ray here comes to the aid when no effective remedy against anæmia could be employed at that time. It preserves the blood, sustains strength and assists circulation during acute stages and saves patient's life from inanition, exhaustion and sudden collapse during convalescence and shorten the period of final recovery.

Ultraviolet rays influence the reflex action and soothe the nervous system—The ultraviolet ray indirectly influences the nervous system through its power of acting on the sensory nerve endings in the skin and other organs of sensation and reflexly stimulating the sympathetic system. It thus has great analgesic powers. It restores rest, calmness and sleep in an irritated person. It improves the tone of the voluntary muscles and effects the involuntary ones thus modifying the functions of the organs of the body and their blood supply and internal secretions of the ductless glands. We know very well that, apart from proper food and fresh air, rest and absence of nervous irritability are also essential to good digestion. In gastrointestinal diseases there is a serious disturbance of the nervous system due to malnutrition of the nervous tissues. In early stages fidgetiness and uneasy feelings are marked. The child cries, remains restless, sleeps badly and on the whole looks disturbed and excited. Convulsions are apt to occur. This continuous activity causes muscular weakness. The eyes and mouth of such patients remain open during the sleep due to loss of tonicity and contractile power of the orbicularis palpabræ and oris. If, even now, the attending physician takes no notice of the nervous system the child passes into a state of exhaustion, lies still, taking little or no notice of its surroundings, in contrast to its former active restlessness. It should be understood how important it is to tackle the case before exhaustion sets in. The early alleviation of the symptoms is urgently called for. No diet or drug profits unless rest is obtained. Potassium bromide in a carminative mixture helps but is apt to increase diarrhœa. Opium is good but has no sedative effect in safe doses. The ultraviolet ray in such cases is, therefore, the safest of the remedies and acts like a charm. The child becomes calm and quiet and sleeps well after the very first exposure and his muscle tone begins to improve after a few more treatments. If for nothing else, the ultraviolet ray should invariably be used for its sedative effect in cases of children suffering from grave gastrointestinal disturbances with marked signs of nervous irritability. Another great use of the sedative power of ultraviolet rays could rationally be made in the conservative treatment of congenital plyoric stenosis. It is a spasmodic condition occurring in an infant with unstable nervous mechanism. Most of the

symptoms are due to retention of food in the stomach causing gastric dilatation. Medicines acting on the nervous system are of great help but ultraviolet rays, if used from the very start, should not only reduce the irritability of the pylorus and thus avoid gastric dilatation and its symptoms but also restore the equilibrium of the nervous system and may cure the baby if it could at all be cured by conservative methods of treatment. I have no experience of it.

Ultraviolet rays have bactericidal effects—Ultraviolet rays are essentially destructive in nature. Shorter wave lengths directly kill microorganisms and fungi when exposed to them. This direct effect could be made use of in the treatment of thrush and infective stomatitis of painful nature. There is an important indirect effect as well which can easily be understood when we know that rays destroy epidermal cells also. The protein formed and liberated from the protoplasm of the destroyed cells gets absorbed into the general system and acts like vaccines serums, milk or other foreign proteins. The bactericidal effect of the blood are thus enhanced to the patients' good. In the gastrointestinal disorders of bacterial nature specially in subacute and chronic conditions this indirect effect of ultraviolet rays prove very helpful and is superior to other methods as it combines tonic, roborant and other beneficial effects as well.

Gastrointestinal Conditions Suitable for Actinotherapy

Actinotherapy is useful in the following conditions: (1) Infective stomatitis and (2) thrush (local applications), (3) pyloric stenosis (spasmodic), (4) indigestion due to various causes, (5) gastritis and enteritis of any origin, (6) gastroenteritis (rickety, rheumatic, infective or due to errors in diet), (7) abdominal tuberculosis or tabes mesenterica or any other form, and (8) gastrointestinal disturbances (due to anæmias, asthenias, marasmus, hypotonias of general and nervous origin)

Important Points in the Treatment and Selection of Cases for Actinotherapy

I have found the following points very helpful in selection and proper treatment of cases:—

Immaturity. If the gastrointestinal troubles and marasmus date back to birth and the infant is small and not properly developed the case is of an immature child with congenital weakness. In such cases many courses of ultraviolet ray exposures at regular intervals of, say, three months during the first year and six months during the second and third should be continued irrespective of whether the digestive troubles are later on present or not otherwise troublesome recurrences will occur.

Malnutrition and marasmus. A case of mulnutrition differs from an immature child in the fact that the gastric troubles and emaciation of the former does not start at birth but after a healthy life of three months or so. The child then begins to lose weight and get digestive troubles and emaciation. He appears as a big baby with loose skin and no fat under it. In such cases once the digestive troubles are corrected and weight begins to increase by the aid of ultraviolet rays and other measures it should depend on the condition of the child whether further courses of ultraviolet rays are needed or not.

Malnourishment. This may be due to irregular or unsuitable feeding. The ultraviolet is only needed to help to bring the digestive troubles under control and then the modification in the quantity and quality of food and regularity in feeding would be enough to avoid further troubles. It may be noted that excess of protein in the diet gives vomiting, colic, flatulence and green offensive stools while lack of it leads to a tendency of recurrent catarrh of the mucous membrane. Excess of carbohydrates tends to make the baby look chubby and healthy, a source of deception as to its true health while lack of them produces weakness and lowered vitality. Excess of fat causes sickness after feeding and green motions while lack of it produces rickets which has a tendency to attack specialized tissues and structures of the body like teeth. They are diet disorders and should be treated as such. Powders, astringents and carminatives cannot be too strongly condemned. Bismuth, sodi bicarb, mercury and chalk appear to cure when cure would have come without them. In such cases do nothing but resort to correct feeding, to remove the cause and meet the existing digestive disturbances with ultraviolet rays and see the results. I am sure the results will be surprising.

Rickets. When digestive troubles combine with prerachitic or established signs of rickets the ultraviolet ray is a specific and may be combined with calcium therapy—collosol calcium with vitamin D (Glaxo) in ½ to 1 c.c. doses twice a week is one of the best preparations for the purpose. Repeated courses of ultraviolet ray may be needed in well-advanced cases.

Tuberculosis. Very carefully graded and controlled dosage of ultraviolet rays would be needed in cases of gastrointestinal upsets due to tubercular taint. Suitable dieting and copper or sodium morrhuate alone and/or with collosol calcium and iodine injections would be found very helpful. Beginners should take special care to see that there is no focus, specially of the exudative type in the lungs before undertaking actinotherapy in such cases.

Bacterial troubles. Gastroenteritis due to microorganisms or actual dysenteries would be greatly helped by the ultraviolet ray therapy but proper elimination of toxins and toxic products, specific medicines like saline and antidysenteric serum in bacillary dysentery should not be neglected. The ultraviolet ray will be found very useful and in some cases almost essential during the convalescent stages of such troubles to avert a catastrophe which often occurs after spending all the time, labour and energy in saving the patient during the acute and active stages of the disease. Sudden and fatal collapse during convalescence of acute infective gastroenteritis in children is not uncommon. What actually happens is that when convalescent stage has set in, vomiting already ceased, diarrhœa settled down and the child is inclined to take food and regular though guarded feeding is commenced there appears to remain nothing but severe anæmia and ebbed vitality. Then one day sudden pallor, coldness of the extremities, beads of perspiration on forehead, face and forearms, and unconciousness are noted and then death comes within three to four hours. It is disheartening to watch in a helpless condition all the labour lost but if ultraviolet rays are employed as a routine in convalescent stage of such cases it would be a rarity to come across such a tragedy.

Congenital syphilis. Gastrointestinal troubles with asthenia and marasmus are also found in cases of congenital syphilis. Every effort should be made to find out the cause. The ultraviolet ray treatment will indirectly help the diagnosis as it will appear to make very slow and slight impression on the case unless the specific treatment is combined with it.

Conclusions

The gastrointestinal upsets in children, we have seen, are mostly due to dietetic errors and improper feeding. A good number are rachitic, rheumatic, tubercular or infective in nature. Exposure to cold and chills play a part in some cases while toxic absorption and defective elimination in others. They do not easily yield to routine dietetic and medical treatment if they are in a fairly advanced stage. The rationale of ultraviolet irradiation in this group of diseases, as explained above in detail, lies in its power of increasing resistance to microorganisms and their toxins, its general tonic and roborant effects, its action on the rate of metabolism, increasing the capacity of stimulating absorption and cell-fixation of inorganic and organic substances and rapid elimination of waste products. The number of microorganisms in the intestinal tract is reduced under its influence, absorption is facilitated and catarrh of the mucous membrane throughout the body is lessened. Thus, the tendency even to bronchitis and pneumonia secondary to gastrointestinal disorders is reduced to almost nil. The routine use of ultraviolet ray therapy in this class of disorders will prove to be a very effective, surprisingly rapid, efficient in action and an invaluable aid in the management and treatment of recurrent and almost hopeless cases. Of course, the ultraviolet ray brings into action the resources of the body itself and it cannot act where there is nothing left in the body to be acted upon. We should also be careful not to elate it to the position of a new specific remedy which is expected to act to the exclusion of all other tried and proved therapeutic measures. It is just a useful adjunct to all other known methods and is a very serviceable agent which often acts like a charm and brings quick relief to the patient and great credit and satisfaction to us. I have dealt with this subject in a rather exhaustive manner for two reasons. First, that actinotherapy is either neglected, scoffed at or misused in India and second that no practitioner with a scientific trend of mind would, and should, ever use an agent unless he is acquainted with the rationale of its application and knows by clinical experience, if not of his own, by that of others, the scope and limitations of the therapeutic uses of the agent advocated for his routine practice and I advocate not an empirical but only the scientific use of ultraviolet rays.

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ENDEMIC TROPICAL ULCERS (NAGA SORES) AMONG THE COOLIE RECRUITS IN THE JUNGLES OF ASSAM

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Introduction

Large number of coolies recruited from Singhbhum District were sent to the jungles of Assam, for works in connection with the present war. Few batches returned after some time with peculiar ulcers on their legs and feet, and some in moribund condition. Noting the peculiarity of the ulcers and similarity among them, I admitted some in my hospital in order to study them more carefully.

The patients were residents of Singhbhum district and of Ho tribe. All were quite strong and stout and in excellent health. The clinical history and the character and course of the ulcer in all the cases were surprisingly similar. Two of the patients, who came to me in moribund and comatose condition died of septicæmia within a few days. The others survived and were discharged from the hospital completely cured, excepting two cases who left the hospital before the ulcers healed completely.

Aetiology

All were males between the ages of 15 and 28 years. They were employed in the occupation of digging and carrying earth and had to work in mud about knee-deep. The place of their work was very damp and had occasional showers of heavy rains. Most of the patients gave a history of trauma prior to the development of the ulcers but in two cases, no apparent cause to account for the ulcers could be found. The trauma was usually of the nature of a prick by the broom-stick, or injury by some instrument or fall.

Symptomatology

Only in two cases the ulcers were noticed by the patients at their place of occupation, in others these developed when they were returning. The ulcers were usually seen within 3-6 days of the injury. In those cases where there was no history of any trauma, the ulcers developed within 12-18 days of their going to that place.

Peculiarly, in all the cases the ulcers were seen below the knee, mostly on the dorsum of the foot or on the anterior aspect of the leg. Firstly, a small, pink, hard papule was noticed at the point of injury or on apparently healthy skin. Within a day or two it was converted into a soft bleb, which when burst, gave out a little serosanguinous discharge and formed a shallow ulcer covered with a grey, moist slough. The ulcer gradually extended in all directions, and the slough became more and more thickened and was adherent to the underlying tissue. After a

few days, the centre of the slough liquefied and the ulcers became more deepened. In one case it was as deep as the bone, in others, part of the muscle was only involved. There was excessive discharge which was extremely putrid, thick, glairy and mucoid. Sometimes it was serosanguinous.

The ulcers were circular or oval or sometimes rectangular in shape, depending on the nature of the injury, and were of various sizes. On removing the slough and cleaning the ulcer, the base was found to consist of red granulation tissue. The margins were usually smooth, elevated and presented a cup-shaped appearance. In a few cases the margin was undermined or ragged. In most of the cases, ulcers were multiple. Either there were small satellite ulcers near a big one, or there were two or more ulcers at different parts. Occasionally two or more small ulcers during the process of extension coalesced to form an irregular big ulcer. Pain and tenderness were complained of in all cases. The part around the ulcers were swollen and showed inflammatory reactions. In most cases inguinal glands were enlarged, shotty and tender. Fever was common but no other constitutional disturbances were noticed.

The two fatal cases were rather peculiar. They had extensive superficial gangrenous patches, involving only the skin and the fasciæ of the foot and leg. Discharge was very little or absent and the ulcer was more of the type of dry gangrene. The temperature was very high and the patients were comatose all along and highly toxic due to septicæmia.

Pathological Investigations

Microscopic examination of the scrapings from the margins and base of the ulcers and of the tissue juice obtained by puncture of the margins were made. Large number of fusiform bacilli, leucocytes and pus cells were demonstrated in most of the cases. In some, grampositive diplococci were found, but spirochætes or Leishman-Donovan bodies could not be demonstrated in any of the cases, even on repeated search. Leucocytosis was constant and eosinophilia very common. Blood aldehyde and antimony tests were negative in all cases.

That the condition was infective in nature and was liable to occur in any part of the body where the skin was injured was shown by the following experiment of artificial inoculation, performed on two patients: A small scratch was made on the lateral side of the middle of the left arm. Little of the scraped material from the ulcer was applied over the scratch and dressed. Similar application was done on the other arm where no scratching was done. The typical papule was formed on the skin at the place of the scratch within two days. The papule was converted on the 4th day into a bleb which when burst formed the characteristic ulcer on the 5th day. No reaction was noticed on the healthy control arm.

Course

Two cases died of septicæmia inspite of treatment. They were, however admitted in the hospital in moribund condition. Two cases left the hospital before the healing was complete and the complete course of treatment given. But even in them the improvement was considerable. Five cases had complete cure within 15 days. One case, where the phagedænic ulcer was very deep exposing the bone, took a very long time before showing any appreciable improvement.

Treatment

Suspecting the infective nature of the ulcers, all the patients were kept isolated.

For the first few days, the usual text-book treatments were carried out. The wounds were cleaned with hydrogen peroxide and electrolytic chlorine lotion, sometimes cauterised with pure carbolic acid, and dressed with gauze soaked in pure E.C. There was, however, no improvement with these methods of treatment (the amount of discharge was the same as before and the extension of the ulcer continued). Formalin, B.I.P.P., ammoniated mercury ointment, calomel ointment were all tried but without the slightest effect. Sayer's method of elastoplast strapping was, however, not tried.

The best result was obtained by treatment with antimony. The detail treatment carried out by me on most of the patients and with extremely satisfactory results is as follows:—

(*i*) The patient was put on bed with complete rest. The usual full diet of the hospital was given when afebrile and when there was fever, sago and milk were only prescribed. The patient was asked to drink plenty of water. (*ii*) The leg and foot were put on suitable splints, slightly raised on the bed and all movements restricted. (*iii*) The wounds were dressed morning and evening in the following way: Ulcers were first cleaned very carefully with swabs and E. C. lotion. The limb was put in hot E. C. bath when discharge was excessive and inflammatory reactions present, for about half-an-hour. After removal of all slough and discharges, the ulcer with the skin all round was treated with rectified spirit. Few pieces of gauze containing sufficient tartar emetic ointment (strength: 2 per cent gradually increased to the maximum of 4 per cent), was put over it, then covered with cotton and tightly bandaged. (*iv*) Intravenously urea stibamine (Brahmachari), dissolved in 10 c.c. of 25 per cent glucose solution was administered on alternate days. The dose was graduated in the following way: 0·05 gm., 0·10 gm., 0·10 gm., 0·15 gm., 0·15 gm., 0·15 gm., 0·20 gm., and thereafter in 0·20 gm. doses. The injections were given in the morning on empty stomach. (*v*) One ounce of cod-liver oil mixture (of the Hospital pharmacopœia) was given twice daily after food. (*vi*) Insomnia which was due to pain was treated by giving at bed time a sleeping draught containing 15 grains each of potassium bromide and chloral hydrate and 15 minims of tincture opii, in an ounce of water. (*vii*) The ulcers which were caused by artificial inoculation of the scraped material on the arm was treated by thoroughly cauterising with pure carbolic acid and then applying the tartar emetic ointment. They healed up completely within 3 days. (*viii*) The septicæmic cases were given 50 c.c. of 25 per cent glucose solution, intravenously and 5 c.c. of 5 per cent urea sulphazide solution, intramuscularly, every six hours.

Case Reports

Case 1—Dina Munda, 22 years, male, admitted on 30-5-42, had to stay in Assam for one month. Two weeks after going

to that place, he noticed a small, red, hard and tender pimple on the dorsum of the right foot, near the root of the great toe, which burst after 4 days and formed an ulcer. All other ulcers, which developed later at various intervals were also formed exactly in the similar way. No history of any kind of injury was given. The ulcers gradually increased in size. Altogether there were seven ulcers. Margin of each ulcer was sharply cut, the base was covered with a stinking slough and thick pus, and the floor was hard. They were cup-shaped, the biggest one was ¾" deep. There was excessive discharge of serosanguinous fluid, sometimes of viscid pus from each of the ulcers, which were extremely painful and tender to touch or movement. Pain was more in the night. The temperature was 100°F. on admission, 103°F. on the 3rd day, and 100°-102·5°F. till the 7th day.

Scrapings from the base and margin of the ulcers showed large number of fusiform bacilli, leucocytes, pus cells and gram positive diplococci and other cocci. No Leishman-Donovan bodies or spirochætes could be detected. Total W.B.C.—10,938. per c.mm.: polymorphs.—72 per cent, lymphocytes—13 per cent, large mono.—5 per cent, eosinophils—10 per cent, basophils—nil. Blood-aldehyde and antimony tests were negative. Artificial inoculation with the scrapings from the ulcer on the abraided arm of the patient was successful.

Treatment on ordinary lines for first 4 days were without any effect, rather doing more harm. Antimony treatment with 2-4 per cent tartar emetic ointment and urea stibamine injections were started from 4-6-42. Small ulcers healed completely with 3 injections. The temperature became normal from the 8th day. The total amount of urea stibamine administered was 0·7 gm. by 6 injections. The patient was discharged completely cured on 17-6-42.

Case 2—Serga, 24 years, male, admitted on 30-5-42. The development of the ulcer had a similar history except that there was a small accidental cut by an axe at the site of the principal ulcer, about 4 days prior to actual ulceration. The smaller ulcers were formed in the usual way and with similar stages. There were two ulcers.

Total W. B. C.—10,937: polymorphs—83%, lymphocytes—12·5%, large mono.—1·5%, eosinophils—3%, basophils—nil. Scrapings revealed fusiform bacilli and a few gram positive cocci.

Ulcers completely healed with 5 injections of urea stibamine (Total 0·55 gm.), and the patient was discharged cured on 15-6-42.

Case 3—Daud, 16 years, male, admitted on 30-5-42. A small, whitish hard pimple was noticed about 3 weeks after his going to Assam. No history of any injury. There was only one ulcer, at the middle of the anterior aspect of the right leg. Temperature 100°F. on admission, normal from the 4th day.

Total W. B. C.—12,500: polymorphs. 75%, lymphocytes—12%, large mono—6·5%, eosinophils—6%, basophils—0·5%. Scrapings showed fusiform bacilli and pus cells only.

Few applications of the antimony ointment cleaned the ulcer nicely, and the discharge was much less. Marked improvement was noticed after 2 injections of urea stibamine (Total 0·15 gm.). But the patient left the hospital on 7-6-42 before the complete course of treatment could be given or the wound healed fully.

Case 4—Sukrum, 15 years, male, admitted on 23-6-42, had an accidental fall which caused two abrasions on the left leg, which developed into typical ulcers within 3-5 days.

Total W. B. C.—8,437: polymorphs.—62%, lymphocytes—28%, large mono.—2%, eosinophils—8%, basophils—nil. Microscopic examination of the scrapings showed large number of fusiform bacilli, gram positive diplococci and pus cells.

Antimony treatment was at once carried out, and within 3 days definite improvement was noticed. The patient left the hospital on 6-7-42, almost cured by 6 injections of urea stibamine (Total 0·70 gm.).

Case 5—Lalkan Munda, 28 years, male, admitted on 30-5-42, in semicomatose condition. There was extreme gangrenous ulceration of whole of the dorsum of the left foot. In the centre there was a black area, 4" in diameter. The ulcer was skin deep. There was not much discharge, rather the part looked dry. The whole of the foot, ankle and leg upto the knee were swollen. The inguinal glands were not palpable. There was the history of a prick by a piece of wood, a few days prior to the ulceration. The temperature was all along above 104°F. and the patient was highly toxic.

Total W. B. C.—13,125; polymorphs—90%, lymphocytes—8%, large monocytes—2%, eosinophils—nil, basophils—nil. No parasites were found in the blood films. There were no meningeal symptoms. The patient died on 4-6-42.

Case 6—Daru Munda, 20 years, male, admitted on 28-5-42, in a comatose condition. There was extreme gangrenous ulceration of whole of the right foot and leg, without appreciable discharge. The muscles of the leg which were exposed looked black and dry. The temperature on admission was 102·5°F., which gradually rose to a maximum of 105·5°F.

Total W. B. C.—18,750: polymorphs.—86%, lymphocytes—10%, large mono.—4%, eosinophils—nil, basophils—nil. There was no parasite in the blod film examined. The patient was highly toxic and died on 1-6-42.

Case 7—Habil, 17 years, male, admitted on 31-5-42. There was the history of a prick by broom-stick, and 4 days later a small pimple developed at that point of injury, which afterwards was converted into an ulcer. There were two circular ulcers (but history of only one prick), which were very painful and tender to touch. The temperature on admission was 100° but all along normal after the 2nd day.

Total W. B. C.—10,720; polymorphs.—72%, lymphocytes—18%, large monocytes—4%, eosinophils—6%, basophils—nil. The scrapings showed large number of fusiform bacilli and gram positive diplococci and other cocci.

Antimony treatment was started from 4-6-42 and 7 injections, making a total of 0·9 gm. of urea stibamine caused complete cure. The patient was discharged on 17-6-42.

Case 8—Mansuk, 16 years, male, admitted on 31-5-42. There was the history of prick by a broom-stick, and the ulcer developed in the usual way. There was only one ulcer on

the middle of the anterior aspect of the right leg. The temperature on admission was 102°F. It was remittent with the maximum of 105°F. and became normal on the 9th day.

Total W. B. C.—6,250; polymorphs.—70%, lymphocytes—22%, large mono.—5%, eosinophils—3%, basophils—nil. The scrapings showed only pus cells and leucocytes.

5 injections of urea stibamine (Total 0·55 gm.) completely healed the ulcer. The patient was discharged cured on 17-6-42.

Case 9—Nanda Munda, 26 years, male, admitted on 30-5-42. There was a round ulcer, 1" in diam., on the middle of the medial margin of the right foot. There was no fever.

Total W. B. C.—7,813; polymorphs.—77%, lymphocytes—18%, large mono.—1%, eosinophils—4%, basophils—nil. Scrapings showed gram positive diplococci, fusiform bacilli and pus cells.

3 injections of urea stibamine (Total 0·25 gm.) was given. The patient was discharged cured on 10-6-42.

Case 10—Rega Munda, 26 years, male, admitted on 28-5-42, in a very low but highly toxic condition and with a temperature of 103·5°F. He had a big ulcer on the medial aspect of the left foot, near the heel.

Total W. B. C.—18,750; polymorphs.—90%, lymphocytes—8%, large mon.—2%, eosinophils—nil, basophils—nil. Scrapings showed only pus cells.

For a few days the following treatment was carried out: intravenous injection of 50 c.c. of 25 per cent glucose solution, intramuscular injection of 5 c.c. of a 5 per cent urea sulphazide solution, and E. C. dressing of the ulcer, each twice daily. This improved the general condition of the patient, but the temperature was still above 101°F. and the condition of the ulcer was worse, *i.e.*, more phagedænic in nature. Antimony treatment was started from 3-6-42, but injections had to be stopped after the 4th one (Total 0·40 gm.), as the condition of the wound was getting worse than before, though the temperature came down to normal. The ulcer was extending in size, it was so deep as to expose out the calcaneum bone, and there was excessive thick stinky discharge. It was then dressed twice daily with formalin and E. C., and then bandaged tightly after applying sufficient amount of 4% tartar emetic ointment.

Blood was again examined on 18-6-42. Total W. B. C.—5,937; polymorphs.—65%, lymphocytes—18%, large mono.—4%, eosinophils—13%, basophils—nil. The microscopic examination of the scraping material now showed large number of fusiform bacilli and leucocytes.

Injection of urea stibamine was again resumed, and the ulcer began to show slow but definite improvement. After 8 injections, (Total 1·1 gm.), the wound healed up almost completely. The patient who is very weak, is still in the Hospital.*

* Since the preparation of this article, three more cases of tropical ulcer have come to the author's notice, who are being investigated and treated in the similar line.

Discussion

Tropical ulcer (synonyms—tropical sloughing phagedæna, ulcus tropicum, naga sore, Mozambique ulcer, Yemen ulcer) is said to be a gangrenous ulceration of the skin and subcutaneous tissues, of unknown ætiology, resulting in the formation of sloughing ulcers of great chronicity. It is usually met with in damp, steamy jungles in the tropics, *e.g.*, in Assam, Cochin, China, Malaya, certain parts of Africa and Melanesia, and is common in debilitated and diseased populations. A small abrasion or wound or an injury causing a slight breach of the skin surface usually form the starting point of these ulcers, and as such they are usually found on the foot or leg; but it is liable to occur in any part of the body. Prowazek thinks the causative organism to be *Treponema Schaudinni*. Gram positive diplococci and fusiform bacilli are also usually found in the ulcers. The condition is directly transmissible by inoculation of ulcer material from man to man, and thus satellite ulcers may develop by autoinoculation near the original lesion or in another part of the body. The blood calcium content is said to be much diminished, probably as the result of deficient dietary. Generally the ulcers persist for months, a factor delaying healing being inadequate epithelial proliferation, even after a healthy granulation tissue base has formed. In bad cases gangrenous process extends to the deep tissues, *e.g.*, muscles, tendons, nerves, vessels, joints and even periosteum of the bones. In those cases, if life be spared, great deformity may ensue from different forms of ankylosis or from contracting cicatrices.

At the present moment, due to constant movement of people and evacuation of places, conditions like this may be found in abundance and everywhere. So proper study and discussion of these cases at this time will be quite useful. The ten cases, which I had the opportunity of studying, were from among the people recruited for war purposes, and all were constitutionally quite strong and healthy. The history of formation of the ulcers and their descriptions are quite characteristic and typical. Trauma in most cases was the predominating cause. In those cases where there was no history of any injury, it might be possible that the injury in them was too slight to draw the attention of the person. That trauma is an essential predominating cause has been shown clearly by the experiment of artificial formation of ulcer by autoinoculation of the scraping material.

Lack of a well equiped laboratory hindered me in performing all sorts of bacteriological investigations. Presence of fusiform bacilli seemed to be constant, but spirochætes could not be detected in any case, perhaps due to technical difficulties. Presence of gram positive diplococci and other cocci seemed to be very common, and leucocytosis was most probably due to superimposed infection. Eosinophilia could not be accounted for.

Adenitis which is probably due to secondary infection was almost constant, and pain and tenderness was very common. Fever was reactionary and disappeared with the improvement of the wound condition.

The treatment usually suggested in the text-books has been found to be quite unsatisfactory in my cases. Antimony by way of local application and by injection produced excellent results—the former seemed to me to be more efficacious. They

healed the ulcers not only completely but very quickly, the average time required being about 15 days. The total dose of urea stibamine required for complete cure was on the average less than 1 gm., given in graduated doses. In the case No. 10, the result was not very satisfactory at the first instance, probably due to too much superimposed infection.

The wonderful response to antimony may lead one to suspect the condition to be similar to oriental sore caused by Leishmania Donovani infection. But the typical history of development and characteristics of the ulcers, presence of fusiform bacilli and diplococci and absence of L-D bodies in the scrapings of the ulcer should remove the doubt. Culture for L-D bodies could not, however, be made due to lack of means.

The fatal cases which were highly toxic due to septicæmia, caused probably by extensive superimposed infection, did not respond to any treatment. The antimony treatment could not be tried in them due to their very low condition.

Summary

1. 10 cases of tropical ulcer or naga sore occurring among the war-coolies have been recorded. 8 of them were cured and 2 died of septicæmia.

2. All had a similar history of development and characteristics of the ulcers were typical.

3. Trauma in some form has been found to be the essential predisposing factor.

4. Presence of fusiform bacilli and gram positive diplococci in the scrapings of the ulcer and leucocytosis and eosinophilia in blood have been found to be very common.

5. The typical ulcer could be artificially developed by autoinoculation of the scraping of the ulcer in any part of the body where a breach of skin surface had been made.

6. The usual treatment given in text books has been found to be very unsatisfactory.

7. Special treatment with antimony, by local application of tartar emetic ointment and intravenous injection of urea-stibamine solution in gradually increasing doses has been described. This method of treatment has been found to be most satisfactory and deserves further trial.

Acknowledgments

I herewith record my sincere thanks and gratefulness to Capt. A. N. Banerji, M.B., Civil Surgeon of Singhbhum, for his kindly allowing me to publish these cases. I am also thankful to the staff of the Chaibasa Sadar Hospital, specially to Dr. D. N. Biswas, L.M.F., Second Medical Officer, and Dr. B. K. Sen Gupta, L.M.P., Sub-assistant Surgeon, for their very kind help in the study and treatment of the cases.

URINARY TRACT INFECTION BY BACILLUS COLI COMMUNIS

TARAPADA CHAKRAVORTI, M.B.
Rajbari

Bacillus coli communis is a normal inhabitant of human colon and lower part of ileum. This organism is not without its use to its host as it is supposed to help the digestive process in the intestine and to protect the latter from some infecting microorganisms. Under ordinary conditions, so long as it is confined to its normal limits, it is nonpathogenic to the human system; but under certain altered circumstances, it migrates to other tissues and organs producing inflammatory affections there and thus becomes a menace to the life of the host.

Bacillus coli communis has got a special predeliction for the urinary tract, the organs affected being the pelvis of the kidney, the kidney and the bladder.

Clinical Picture

The urine becomes turbid and acid in reaction. There may be pus or mucopus. Pus may be copious or it may be small in quantity only to be detected under microscope. The urine is very offensive having the characteristic fishy odour. In some cases physical signs and symptoms may be absent and careful urine examination will alone settle the diagnosis.

Acute attacks by B. coli may entirely resolve; it may recur after several months or years, successive attacks getting more virulent and even proving fatal or may ultimately merge into a chronic urinary tract infection. Instrumentation, mechanical defects *e.g.*, enlarged prostate, stricture or stone or tubercle of the kidney or bladder may lead to a chronic urinary tract infection by B. coli. Chronic infection may also come on insidiously. Symptoms in these cases are variable. In some cases there may be general weakness, pale appearance and symptoms of dyspepsia with headache and backache. In others there may be frequent painful micturition with a sense of pain and discomfort over the bladder.

Bacillus coli communis may under certain circumstances infect the blood stream producing what is called B. coli septicæmia. The patient runs a remittent course of temperature which may also be intermittent. There may be chill, rigor, perspiration and vomiting. This affection may resemble an enteric infection. But the onet is usually abrupt.

Bacillus Coli Infection in Females—Bacillus coli infection is more common in females, short and comparatively large urethra and constipation predisposing to the attack. Pregnancy is another predisposing factor. Owing to the small size of the uterus, the incidence is loss common in the earlier months of pregnancy. In the latter months especially fifth or sixth month, owing to the compression of the ureter at the pelvic brim by the gravid uterus there is some retention of urine which lowers the resistance of the mucous membrane of the pelvis making it vulnerable to infection by bacillus coli.

Bacillus coli Infection in Children—Bacillus coli communis not infrequently affects young children especially female children

between 6 months and 6 years. The pelvis of the kidney and the bladder may be affected. The child is suddenly seized with a sudden high rise of fever with rigor and vomiting. There may also be convulsion. The temperature may also be remittent or intermittent. The patient is usually drowsy and there may be squinting of the eyes. There may be constipation of the child may pass frequent green slimy stools.

Though an affection of the urinary tract, symptoms pertaining to the affection of the pelvis and the bladder may be entirely absent. This condition is frequently mistaken for malaria and less frequently for typhoid, kala azar or tuberculous meningitis.

A specimen of urine is to be collected for general and if possible for cultural examination. Acid reaction, presence of pus cells and albumen will suggest B. coli infection. Careful blood examination is also necessary for proper diagnosis. A negative Widal reaction of the blood will eliminate the possibility of typhoid fever. Tuberculous meningitis will reveal distinctive features of intracranial disease with excess of lymphocytes and presence of tubercle bacilli in C. S. fluid though blood and urine may give negative results.

The infection often runs a chronic course and is very frequently one of the causes of obscure fever in children. There may be daily rise of temperature and associated with it there may be chronic gastroenteritis with the result that infection may pass from the bowel to the pelvis of the kidney.

Case Notes

Case 1—Mrs. Bagchi, H.F. 50, had typhoid fever in August, 1941. The disease had all its virulence including delirium, diarrhœa, bronchopnuemonia and bed sores. The temperature came down to normal after a period of 30 days when toxæmia diminished and the patient showed signs of improvement. The temperature remained normal for 5 days and then rose and continued between 99°F. and 101°F. with occasional remission. The patient grew somewhat drowsy with low muttering delirium. The pulse rate was 120-130 per minute and it was of low tension.

There was strangury and frequency of micturition, the patient occasionally screaming with pain at the time of passing urine. A few days later there was complete retention and catheterization had to be restored to. The urine was turbid and extremely offensive. There was sediment as well as flakes of floating mucus.

The patient was put to the following treatment.

(1) Re/

Soda benzoas—gr. vi, Pot. citras—gr. xx, Spt. ætheris nitrosi—m. x, Tinct. hyoscyamus—m. xxx, Syr. auranti —m. xxx, Aqua ad—oz. 1. t.d.s.

(2) Urotropin tablets—Grains 7½ (Schering) 1 tablet dissolved in a little water thrice daily.

(3) Bladder wash after catheterization with acriflavine lotion (1 in 10,000).

The treatment was continued for about 6 days, but no appreciable improvement could be found. A catheter specimen of urine was then sent for cultural examination which showed the growth of innumerable B. coli.

The following line of treatment was then adopted: (1) Amoket (Boot's)—Two teaspoonfuls at a time, 3 times a day. (2) B. coli vaccine—½, 1, 2, million every 5th. day. (3) Bladder wash as before.

Five days later the following improvement was noted in the condition of the patient: (1) Temperature came down to normal, but again rose, the highest rise being 99°F. (2) Catheterization could be discontinued though there was strangury and micturition was somewhat painful. (3) Physical character of the urine somewhat improved. (4) Toxæmia much less than before.

Subsequently there was definite improvement in all the symptoms of the patient. There was daily remission of temperature, highest rise being 98°F. or 98·4°F. Amoket was stopped for 3 or 4 days when all the symptoms returned. Amoket was again given. A few days later the patient became completely afebrile and gradually all the symptoms disappeared. The patient took a long time to recoup. Though cured of her disease she had for several months slight urinary troubles in the shape of frequency of micturition and burning sensation.

Case 2—Mrs. Paul, H.F. 19, examined 25-4-41 gave a history of pregnancy for 6 months and of fever for 13 days. During this period the temperature came down to normal on two occasions. Restlessness, especially when the temperature shot up, sweating and thirst were present. The patient was extremely anæmic. The temperature was 103°F and pulse rate 130 per minute. The liver was tender and felt 2 fingers below the costal margin; the spleen was also tender and 4 fingers below the costal margin; the urine was small in quantity, slightly offensive and there was frequency of micturition. Previous history of malaria was present.

The patient was put on an alkaline mixture for 2 days. The temperature came down to 97° on the second day, and again rose to 102°F. On 28-4-42 the temperature suddenly shot up to 107°. There was marked restlessness and slight pain over the uterus. The patient was put on a mixture containing potassium bromide, extract viburnum prunifolium and alkalis. Considering the urgent condition and pain over the uterus, Atebrin 0·3 grm. was injected and the dose repeated next day. There was no remission of temperature which was varying between 102° and 103°F. On 1-5-42 condition of the patient was as follows: Anæmia more intensive than before; frequency of micturition and strangury became fairly marked; the patient become somewhat emaciated and toxic; a hæmic mumur was present in the pulmonary area; the apex beat was in the 6th intercostal space a little outside the midclavicular line; the urine became more foulsmelling, and turbid and contained on several occasions blood.

The blood examination showed: W.B.C.—11,000; polymorphs—78%, lymphocytes—20% large mono—2%, no M.P. The urine was acid in reaction. There were albumen (+), a few casts, R.B.C. and W.B.C. (+) and motile bacilli (++). Culture revealed growth of B. coli.

(*Continued at foot of page 168*)

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FOOD PROBLEM

Every body is experiencing the high price of food and fuel. It should always be kept in mind that the average income per head is 2½d. a day. With the increase in prices, the average income per head has not risen. Naturally the population who could not afford two meals a day is foregoing it almost altogether. Any person who has some idea of the rural population will corroborate it. In other words we are heading to a condition verging on famine, if this is allowed to continue further. Starvation and malnutrition are two factors which make a suitable soil for epidemics. In our country malnutrition and epidemic diseases are chronic conditions. Any additional burden will absolutely break the last line of resistance, so the medical profession is vitally concerned in the problem.

This problem is being discussed in public platforms and press for the last six months. Uptil now the efforts of the Government have been patchy and propaganda in drawing rooms. The propaganda has been mainly directed to show the hungry population three factors—(a) Increase in the population of India —between 1900-1938 the population has increased by 25 per cent. (b) Diminished import—in peace time India used to import rice from Burma, Thailand and Indo-China to the extent of 1·1 to 2·6 million tons a year representing the food intake of 12 million out of 240 million rice consumers in this country. This source of food supply has now completely stopped. (c) Hoarders and profiteers are evading the regulations or withholding stocks with the inevitable development of "black market." We are told these are the causes of food shortage and high prices.

This propaganda is based on partial truth but the whole reason of food scarcity do not depend on them. This seems to be a sort of excuse, if we examine the explanations more thoroughly. It will reveal that for the last fifty years, the Government had been absolutely uninterested in these problems and only this war, with all its cruelties, has unveiled this ugly situation.

Although the population of India has increased during the last 38 years, the average longevity is still 24 years. The incidence and mortality from epidemic diseases remain the same as 60 years back. The average income per head remains the same. The food supply available for consumption has actually diminished by 7 per cent during the years 1900-1938. The Government was aware of the increase in the population but no planned agricultural drive was thought of. Cultivable waste land still remains unutilised. Assam contains 18·8 million acres, the Central Provinces and the Punjab have 14 million acres each, Madras 10 million acres and Sind 5·8 million acres. Officers of the top-heavy department of Agriculture were too keen to give lectures and issue bulletins rather than put through practical measures for increased production, which needed improved seeds, manure, irrigation and rendering available more land for cultivation and for proper distribution of food. The illiterate agriculturists are bound by old ideas of cultivation, crop-planning and food habits. Too often the expansion of cash crop has upset the customary rotation in which peas, gram and oil seeds used to appear in an arranged succession and this has contributed both to reduce soil fertility and the nutritional standard of the people. The following table of comparison with two other Asiatic nations, is instructive:

Yield in pounds per acre

	Japan	*China*	*India*
Rice	3,070	2,433	988
Wheat	1,350	989	811

Land settlement and rural development schemes still remain shelved. In our country 71 per cent of the population depend on agriculture for a livelihood. A further 15 per cent are engaged in occupation directly connected with agriculture. The cultivating tenants have to bear two overwhelming burdens—rent and taxes. On an average, approximately one half of the gross produce of a farm goes in rent, but the landlord rarely makes any appreciable contribution towards the expenses of production. The net income of a cultivating tenant is frequently a minus quantity. That is he goes into debt. As a result the villages come increasingly under the domination of moneylenders. In 1929 the total rural indebtedness in India was estimated to be about £675,000,000. Between 1921 and 1931 there was an enormous increase in the number of landless labourers. About 40 per cent of the labourers are able to find only six months' work every year. Since they have nothing to fall back upon, they live in a condition bordering on serfdom. The agricultural methods are exceedingly primitive. The Government has done little to encourage the adoption of improved methods. The total State expenditure on agriculture amounts to about £870,000 per annum, whereas the Government draws about £25,000,000 per annum in land revenue from the peasantry. This policy of land administration has to be changed. The development of industries subsidiary to agriculture, particularly during the non-working seasons of the year, will be found to bring about a distinct improvement of the ryot's economic position. With the low income the peasant is more willing to go for cash crop or inferior cereals such as barley, *bajra*, *jowar* and maize. These grow on poor lands and entail less cost of cultivation and have a better demand with the poor. In the recent years these inferior cereals have shown expanded acreage often at the expense of rice and wheat. On the other hand consumption of these cereals has caused further deterioration in the nutritional standard of the masses.

During the year 1942 there has been a decrease of rice production by 5·1 million tons. This together with the stoppage of supply from Burma and Far East makes a total deficit of 7·5 million tons. The production of wheat has increased by 70,000 tons from the normal average of 10 million tons. The

export of wheat in 1941-1942 was about 160,000 tons and of wheat flour 82,000 tons. Taking all these factors under consideration India is facing this year a shortage of food supply for about 63 million persons, a population bigger than British Isles. This is a serious situation and demands immediate relief. Arrangements should be made to import rice and wheat from Africa, Australia and Canada. Export of any food from India must be stopped immediately. It is very unfortunate that the Government has not published any export figures of food material during 1942-1943. The reason is not known. The agricultural front should be expanded simultaneously with all these measures.

As in any other country there is no dearth of hoarders and profiteers in our country. The Indian Police and Intelligence branch are known all over the world for their efficiency. One wonders how can the culprits evade regulations and price control or even remain hidden with, say, 5,000 maunds of wheat or rice. A press communique, published on 22nd April, 1942, tells us that the Government of Bengal proposes to buy 54 million maunds of rice. Though this statement has been subsequently repudiated statements like this always bring in speculators in the market. It will be interesting to know how much essential food stuff has been bought by the India Government. If there are any surplus, will the Minister of Food release it for areas showing rice deficit such as Central Provinces and Berar, Bombay, United Provinces, Behar, Assam, Madras and the Punjab. How is it that in Bengal, showing a rice surplus of 1,351,000 tons the price has gone up more than 200 per cent?

The Government of India has recently set up a Central Food Advisory Council to study and plan food and fodder production. It is evident that activities of the various departments of Government, *e.g.*, Agriculture, Industries, Education, Irrigation, Medical, Veterinary and Co-operative have to be co-ordinated to bring any measure of help to the hungry 63 millions. This should be done with speed and efficiency.

In times of food shortage adulteration is another danger to health. To the majority of our people it is futile to talk of deficiency diseases when the essential commodities of diet are not available. But people who have plenty, may stop misuse, waste and casual feeding habits.

"Wars are won and lost not merely on the battle fields but also in the fields of agriculture. War production and defence in India will fail as a result of starvation, food riots and epidemics—unless and until the Government of India courageously adopts an All-India policy of distribution of food requirements and abolishes interprovincial barriers and each provincial Government systematically plans an enhanced food production and proper distribution of food grains district by district."[1]

[1] Mukerjee, R. K. (1943)—'India must grow more food', *The Illustrated Weekly of India*, 64:4.

(*Continued from page 166*)

The patient was put on:

(1) Amolex—(Mandelic acid preparation). 2 teaspoonfuls, 4 times daily, (2) A mixture containing potassium citras and tincture hyoscyamus. (3) Cardiazol tablet 1 twice daily. (4) Glucose 25 per cent solution 25 c.c. intravenously twice a day.

The patient developed nausea. Amolex was stopped for 1 day. Next day it was given again, 1 teaspoonful at a time sufficiently diluted with water 6 or 7 times a day. 5 days after the beginning of Amolex treatment slight improvement of symptoms was noticed. The temperature and urinary troubles somewhat improved and this condition of slight improvement continued for about 10 days. Amoket 2 teaspoonfuls 4 times daily was then prescribed. 4 or 5 days later the patient seemed to be distinctly improving, the temperature varying between 99°F. and 100°F. inspite of treatment for sometimes slight fever and urinary symptoms *e.g.*, occasional burning sensation during micturition and turbidity of the urine persisted. It was not before a period of 6 weeks from the onset of the disease that the patient was thoroughly free from fever. The patient delivered a healthy child at full term and the puerperium was normal.

Discussion

Incidence of bacillus coli communis infection is not very infrequent in Bengal, the urinary tract infection being more common. In villages for want of proper laboratory aid, the practitioners have to face with a good deal of difficulty in coming to an early and correct diagnosis with the result that may be mistaken for other disease often with consequent fatal result. Owing to the presence of high fever, rigor, vomiting and cerebral symptoms it is often mistaken for malaria, tuberculous meningitis, typhoid fever, teething, kala azar and acute hepatitis. A correct diagnosis is necessary to save the child. High fever with convulsion may warrant a practitioner to administer antimalarial treatment.

Injudicious administration of quinine salts in cases of B. coli infections may do much harm in as much as quinine is an acid salt and being a renal irritant and cerebral excitant may produce anuria and convulsion.

It is not unlikely that a case of acute B. coli infection with high fever, rigor, vomiting and discharge of blood in urine may be mistaken for blackwater fever at the first sight. I had two such cases. Treated for 2 days as blackwater fever, when the urine cleared up but the temperature persisted. Subsequently, urinary symptoms appeared and the temperature continued for a pretty long time.

The incidence of B. coli infection after typhoid fever is not uncommon and in villages it is often mistaken as a relapse or an associated malarial infection.

CURRENT MEDICAL LITERATURE

MEDICINE

Early Diagnosis and Treatment of Intestinal Tuberculosis

Ukil (*Indian M. Gaz.*, 1942:78:613) found 176 cases of tuberculosis out of 1000 consecutive autopsies. 51·1 per cent were cases of tuberculous ulceration of the intestine; in 5·1 per cent no demonstrable tuberculous lesions were present in the lung or in any other organ; the appendix was involved in 3·9 per cent and the peritoneum in 13·0 per cent of the cases. Regarding the types of lesions in the intestine the work of Tribedi (reviewed by the author) showed that ulcerations were present in 95 per cent, tubercle formation without ulcers in 3 per cent and the remaining 2 per cent showed the hypertrophic or hyperplastic form. Regarding the sites of lesions in the intestine the same work revealed that although no part was exempt from lesions the most frequently involved portion was the ileum (86·7 per cent), the ileocæcal region coming next in order (65 per cent) and the jejunum the third (34·5 per cent) and the lesions were limited to the small intestine in 31·5 per cent, to the large intestine in 12·3 per cent and were found in both in 56·1 per cent of cases. The hyperplastic type was limited to ileocæcal region. The author could not obtain any bovine type of tubercle bacilli from the numerous strains isolated from tuberculous lesions in many parts of the body at all stages.

The author lays great stress on the importance of early diagnosis as it is in its infancy that the disease can be cured by a combination of various methods including radiation and vitamin therapy. The symptoms of early intestinal tuberculosis may be as slight and as indefinite as those of early pulmonary tuberculosis. They are: pain and tenderness in the cæcal region, vague dyspeptic symptoms, diarrhœa, alternate diarrhœa and constipation, slight to moderate amount of anæmia, loss of weight and rise of temperature. Any patient with chronic pulmonary tuberculosis who fails to gain in weight or to make satisfactory progress should be studied for the existence of tuberculous enteritis, no matter how slight the abdominal symptoms are. Many of the above symptoms may be present without any demonstrable disease in the intestines. Physical examination may not reveal anything except localized tenderness in the right iliac fossa. There may be palpable glandular enlargement in certain cases and muscular rigidity in cases where the peritoneum is involved and when the infection is acute. It appears that the presence of tuberculous enteritis is first suspected by an alert examiner and then confirmed by certain laboratory and radiological investigations though the latter may not yield conclusive evidence in some cases. Laboratory methods are examinations of fæces and blood—large majority of the cases reveals red cells and occult blood in the fæces; a certain amount of anæmia is almost always present and there is in most cases a relative increase of neutrophiles and monocytes. X-ray examination constitutes the best single means of diagnosis—localized spasm and hypermotility of the bowel occur in the region of the ulcer as is evidenced by barium meal and barium enemata. Prognosis is extremely bad unless it is diagnosed in the early stage. As most of the cases are secondary to pulmonary tuberculosis, attempts at prophylaxis should be made by teaching the patients not to swallow the sputum, by giving them a high vitamin diet and a little hydrochloric acid after meals and keeping a watch on the earliest symptoms.

The following principles of treatment are advocated:

Rest in bed—The rest should mean both physical and psychological rest. A cotton wool pad on the abdomen is of value in relieving discomfort. Chills must be avoided. *Diet*—The patient should be given a high caloric, high vitamin and low residue diet. Cod liver oil in full doses should be given in orange, carrot or tomato-juice; if cod-liver does not agree viosterol 20 drops thrice daily. *Heliotherapy*—Ultraviolet radiation has been used extensively in America and in a few centres in India with encouraging results which, of course, depend on several factors, such as the general condition of the patient, the condition and extent of the disease in the intestines, the response to light therapy in general, the reaction of the skin, etc. In applying ultraviolet radiation care should be taken that the erythema produced by exposure is slight and that it fades quickly and should give a sense of comfort to the patient. In determining the dosage, the clinical picture, hypersensitiveness of the lesions, the skin reactions, sense of fatigue, and rise of temperature have all to be borne in mind. *Roentgen ray treatment*—Benefit has also been claimed from x-ray treatment. Where ultraviolet ray therapy alone does not give satisfactory results it might be combined with roentgen therapy. If heliotherapy and x-ray exposures are simultaneously employed then the dosage of x-ray must be cut down. *Pneumo- or oxygen peritoneum*—The author has not found it very effective in the few cases he tried. *Surgical Treatment*—The results of surgical treatment in tuberculous enteritis have not been very encouraging except in cases of hyperplastic type. Not only the operative mortality is highest, the after results are not satisfactory. Heliotherapy and ultraviolet therapy have given better results. In cases of localized intestinal disease, where a small part of the bowel is involved, a local excision may be undertaken. Two chief contra-indications to operations are: extensive and progressive pulmonary involvement and extensive disease of the small bowel. *Medical treatment*—Drugs are only useful in the treatment of symptoms. For loss of appetite, pale tongue or sense of weight after meals either mineral acids after or alkalis before meals may be used. For relief of pain local application of an ointment (containing 1 drachm each of methyl salicylas and menthol in 4 drachms of lanolin) or turpentine stupe after meals, heliotherapy, calcium chloride given intravenously or irrigation of colon with 1 in 5,000 acriflavin solution when lesions are chiefly confined to iliocæcal region. To control diarrhœa diet must be adjusted and castor oil is to be tried (½ to 1 oz., once a week or ½ to 1 drachm in tomato or orange juice daily after meals) and followed by astringent drugs such as kaolin, bismuth, coto, etc.; opium may be necessary. Gold in small doses may be tried with benefit in early cases.

Mental Symptoms in Bromide Intoxication*

Kitching (*Brit. M. J.*, 1942:1:754) who is Psychiatrist to the Manchester Royal Infirmary, points out that skin rashes are usually thought of when intoxication with bromides occurs, and

that mental symptoms are common, but less widely known. Bromide is one of the most commonly used drugs and is included in at least five million prescriptions annually in Great Britain. In the present paper nine cases are described in which bromide intoxication was shown chiefly by mental symptoms. The first case was that of a woman with a blood bromide concentration of 325 mg. per 100 c.c. who died. Seven other cases of severe degrees of bromide intoxication which recovered are described, and one case of mild intoxication is also reported. The diagnosis of bromide intoxication depends on the history, physical and mental symptoms, the blood-bromide level and the response to treatment. A history of taking "salty" medicine is, of course, important. The mental symptoms are as follows: There is decrease of perception, leading to disorientation and true confusion, *i.e.*, clouding of consciousness with lack of awareness of environment and failure to respond to external stimuli. Motor restlessness is invariably present, and there is emotional instability usually with a depressive trend. Paranoid ideas are extremely common, but they are fleeting and changeable. Finally, personal habits deteriorate in extreme stages. The physical signs are those of a toxic condition, with muddy complexion, furred tongue, tremor of the fingers and perspiration. The blood bromide level is over 200 mg. per 100 c.c. (normal level 100-200 mg. per 100 c.c.). Levels under 100 mg. per 100 c.c. can be ignored. Levels between 100 and 200 mg. per 100 c.c. are likely to cause symptoms in elderly patients with renal or cardiovascular disease and diminished salt intake. Levels over 300 mg. per 100 c.c. cause symptoms and are sometimes fatal. Treatment is by the administration of sodium chloride, and the dramatic response to this is one of the diagnostic tests. Additional elimination of bromide is achieved by lumbar puncture, purgation, and intravenous saline. The author concludes that while bromide is a most useful and indispensable drug there is a definite risk that it may give rise to symptoms of poisoning, but these can be recognised and easily treated if the danger is remembered.

Incidence of Neurosis in England under War Conditions*

Lewis (*Lancet*, 1942:2:175) who is Clinical Director to the Maudsley Hospital, London, summarises and analyses information derived from several large urban centres. He concludes that air-raids have not been responsible for any striking increase in neurotic illness. Crude figures from hospitals and outpatient clinics even suggest a considerable drop; the Ministry of Pensions figures, however, give a better indication of the problem. Reliable data from London and Bristol, and the impressions of good medical observers, indicate that after intensive raids there is a slight rise in the total amount of neurotic illness in the affected area, occurring chiefly in those who have been neurotically ill before. Neurotic reactions may not show themselves for a week or ten days after the bombing; they usually clear up readily with rest and mild sedatives. Hysteria is uncommon, anxiety and depression are the commonest forms of disturbance. The incidence of neurotic illness had been low in fire-fighters and other workers in civil defence. Insanity has not increased, so far as figures are to hand, though more persons with senile deterioration have been admitted to mental institutions than before because their relatives could not any longer look after them or because the raids had in other ways disturbed their routine and their precarious adaptation. The same was true of some defectives. Suicide has diminished in Scotland especially among the middle-aged and elderly. Figures for England and Wales are not available. It is impossible to distinguish between neurotic illness due directly to air-raids and that which may follow such secondary troubles as disruption and loss of the home, evacuation, difficulties in transport to and from work, or temporary loss of employment. It is to the war as a whole, with its accumulated stresses, that people have had to adjust themselves, and signs of failure to do this can be taken as warning signals of neurosis. An increase in alcoholism would be such a sign; there is no evidence that there has been any increase of this sort. The rise in road and industrial accidents has been considerable; many causes are at work among which the psychological ones have not been analysed. There has similarly been a rise in juvenile delinquency: this cannot be regarded as tantamount to a rise in juvenile neurosis, but it suggests that the same environmental factors are at work as conduce to neurosis.

Soluble Phenytoin in Epilepsy*

Tullidge and Fox (*Lancet*, 1942:2:6) write that this paper is a clinical survey, based on the authors' investigation at the Lingfield Epileptic Colony, of the effect of soluble phenytoin (epanutin, dilantin, sodium diphenylhydantoinate) on a group of older children and adolescents suffering from epilepsy. In every case bromides (in doses of 1·5 to 2·0 g. daily) and phenobarbitone (0·15 g. daily) had failed to arrest the fits. The dose of phenytoin was increased until either the fits stopped or toxic manifestations appeared. Given in this way the drug proved a most effective anti-convulsant, but in over a third of the cases toxic manifestations were severe enough to call for its withdrawal. Few of the young people tolerated a dose larger than 0·4 g. daily. *Petit mal* attacks were adequately controlled in only one case. This was a boy who, according to all the accepted criteria, had pyknolepsy. Under phenytoin, the slight attacks ceased, but a single major fit occurred. Recurrence after a period of freedom was less common with phenytoin than with phenobarbitone, but was more liable to take the form of a series of fits. The most important and most frequent toxic manifestations were neurological. In more than a quarter of the whole series, they were severe enough to call for withdrawal of the drug. The five cardinal signs were nystagmus, diplopia, ataxia, vomiting and tremors. They rarely occurred singly. Vomiting was included as a neurological sign because when persistent it was always accompanied by other neurological signs. Neurological signs tended to appear with larger doses, and were sometimes delayed for months after the administration of any given dose. Skin rashes appeared early, and often with small dosage. They were uncommon but were usually accompanied by fever, and the condition was serious enough to necessitate discontinuing the use of the drug. Hypertrophy of the gums was common, but in no case serious enough to call for interference. The mental conditions varied from dramatic improvement to grave deterioration, and no common features could be formulated in the very varying pictures presented. In only a few cases were they severe enough to require reduction or withdrawal of the drug. A group of adult patients would almost certainly show more mental disturbance.

The authors draw the conclusion that phenytoin should be reserved for cases of epilepsy which do not respond to the older remedies, and that close and continuous medical supervision is essential during the administration of the drug.

The Treatment of Scabies*

Mellanby and others (*Brit. M. J.*, 1942:2:1) write that there is considerable uncertainty regarding the best methods of treating scabies. Scabies is, however, caused by an invasion of the human cuticle by the parasite *Sarcoptes scabiei de G. var hominis*, and a final estimation of the value of various treatments must be assessed by their ability to kill the parasite under clinical conditions. The authors have developed methods by which they belive that over 90 per cent of the adult female parasites can be detected, and in their experiments they have assessed cures by examination of the parasites removed from human cases. Most of the adult female *Sarcoptes* infesting each case were removed and examined twenty-four hours after treatment and the proportion killed was noted. Those medicaments which were efficient gave equally good results when applied to the skin without preparatory bathing or scrubbing. A single thorough application of 10 per cent sulphur ointment, of Marcussen's ointment, of benzyl benzoate of any strength greater than 10 per cent made up either in a spirit solution or in a watery emulsion, or of dimethyl diphenylene disulphide, killed over 98 per cent of the parasites. The following substances were found less effective:—pyrethrum, rotenone emulsion, derris root lotion, beta naphtal and lethane. Methods which produced a coating of sulphur particles on the body (dusting with precipitated sulphur, painting with thiosulphate followed by hydrochloric acid, sulphur foam tablets) were found very inefficient. Sulphur taken internally had no effect on *Sarcoptes*. To paint on a benzyl benzoate emulsion requires some skill and unless trained personnel is available it is sometimes advisable to use a sulphur ointment which, even if applied inefficiently, will work itself all over the body. Not more than two applications of an efficient medicament are required, though it should be noted that in many patients symptoms such as itching may take many days to disappear, but they do disappear eventually without any further treatment

SURGERY

Urogenital Tuberculosis

Band (*Edinburgh M. J.*, 1942:49:273) writes that tuberculosis in the urinary tract develops primarily in the kidney and tuberculosis of the urinary bladder is always secondary to renal tuberculosis. For successful treatment of renal tuberculosis a diagnosis must be made long before the bladder has undergone widespread ulceration and contracture. Frequency and pyuria (often unsuspected by the patient) require a complete urological examination. Preliminary x-ray examination is often helpful, as a chronic renal focus may undergo calcification which, though sometimes massive, usually has a localised and petechial distribution without the more homogeneous density of renal stone. The presence of pus cells without organisms in an acid urine has for long been the recognised clue to a diagnosis of urinary tuberculosis; cultural and inoculation methods are necessary when difficulties in diagnosis occur or when the type of the organisms is being investigated. Intravenous urography can usually be relied upon to provide an adequate and diagnostic pyelogram of the tuberculous kidney. The presence and state of activity of extra-urinary lesions require for their detection and assessment through clinical and radiological examinations. Tuberculosis may be primary in the prostate, as peripheral lesion or in the urethra and ascend *via* the ejaculatory duct to the vesicles or by way of the vas to the epididymis or in the epididymis and descend *via* the vas to the vescicles and by the ejaculatory ducts to the urethra. Coincidence of renal and genital lesions is relatively common in urogenital tuberculosis and this coincidence should be regarded as possible evidence of independent yet co-existing focal manifestation of the disease.

In the urinary tract the part played by the tuberculous kidney is that of an organ of excretion which never heals and constantly disseminates infection to the bladder. Renal tuberculosis is treated by *nephrectomy* in conjunction with the sanatorium life for six months or one year. This postoperative sanatorium care should be continued till residual ulceration of the bladder has been controlled, frequency of micturition restored to within normal limits and the urine rendered free from tubercle bacilli. If inspite of adequate care persistent ulceration of the bladder with contracture leads to backward pressure on the remaining kidney, such as will endanger its reserve, cutaneous ureterostomy offers a form of relief which is both effective and long-standing. A conservative outlook should be adopted primarily in the treatment of genital tuberculosis. In combined urogenital tuberculosis, if operative treatment is permissible on general grounds, the major source of infection and re-infection in the urinary tract should be dealt with by removal of the diseased kidney and thereafter the genital lesions are treated as their response to general rest may determine.

Sulphapyridine in the Treatment of Tetanus

Ghosal and Chaudhury (*Indian M. Gaz.*, 1942:78:533) in reporting on the results of treatment with sulphapyridine in 37 consecutive cases of tetanus in the Patna Medical College Hospitals observe that out of the 35 cases having the treatment (2 cases left against advice) 18 were cured and 17 died, that of the 18 cured cases 7 had suffered from the severe form of the disease and of the 17 cases that died 3 had 'moderate' and 14 'severe' form of the disease and 10 out of the 14 'severe' cases died within 24 hours of the admission, a period too short to allow the drug to be of any effect. 18 cases were given 3,000 to 6,000 units of antitoxin before they were admitted into the wards; none of the patients could buy serum. No case had any prophylactic antitoxin. The authors hold that though it is not possible to arrive at a definite conclusion from observations made on only 35 cases but the results obtained are satisfactory and deserve a further trial of the drug. Moreover the treatment is cheap and easy to follow. The line of treatment adopted was as follows: Quiet and dark room; essential nursing was done only when the patient was deeply under the effect of sedatives; fluid diet; soap water enema to relieve constipation; sedatives used were bromide chloral hydras mixture by mouth and paraldehyde by rectum—10 grains each of chloral hydrate and bromides of potassium, sodium and ammonium were given every

2 hours for the first 3 days and then every 4 hours; 3 drachms of paraldehyde with syrup are given in an ounce of water twice daily or else 6 drachms in olive oil given twice daily per rectum; for severe cases Evipan-sodium was used to control spasms (5 to 10 c.c. of a 10 per cent solution given intravenously twice a day—the effect of intravenous anæsthetic was kept up by intramuscular injection of 4 c.c. paraldehyde).

Sepsis in Relation to Fractures of the Mandible*

MacGregor (*Brit. Dental J.*, 1941:71:246) writes that sepsis depends on the number and pathogenicity of infecting organisms, and on the resistane of the patient. Fractures of the mandible are more commonly compound than those of other bones, but the resistance of the bone and surrounding tissues is high. Organisms can reach the bone from the blood stream, or from local spread (1) by entry of a foreign body, (2) from a tooth socket, (3) by transit down lymphatics of the periodontal membrane at the time of fracture, and (4) transit down the lymphatics from periodontal membrane or gum later.

These lymphatics run downwards and, after passing along the inferior dental canal emerge at the mental foramen. There is also a fluid connexion between gum, periosteum, and the lacunar system of bone. When the lymphatics are ruptured in fractures with displacement, organisms are poured out in the region of fracture, instead of reaching the lymph nodes. Direct entry of infection from gum into bone *via* lacunae and canaliculi is also possible. Infection of bone may thus take place at the moment of injury, especially if parodontal disease be present, or at a later time. Factors influencing local spread are:—(1) movement between bone ends which breaks down barriers to spread of infection, or movement of teeth (early fixation, avoidance of manipulation, and, in some cases, cessation of chewing minimize this); (2) foci of infection (foreign bodies and hopelessly damaged tissue should be removed at the earliest moment, and wires, etc., crossing the fracture line should be avoided). (3) extraction of teeth. Teeth in the fracture line have probably lost their blood supply and should be removed. But firm teeth not quite involved or unerupted teeth should be left, since their removal may cause spread of infection. In any case movement should be minimized. "There is also a tendency to remove teeth with surrounding parodontal disease not in connexion with the fracture line, in the belief that this will help to clean up the mouth. As has been pointed out previously, the very time that showers of organisms should not be let loose into the bone is when a fracture is present and any interference with such teeth apart from measures of general cleanliness such as sprays and mouthwashes, must be strongly condemned." Analysis of 100 cases of fractured mandible treated at a civilian hospital and an R.A.F. hospital showed that most cases lay in the age-group 20-29 years, and that abscess or sequestrum formation occurred in 30 per cent. There was a rise in incidence of sepsis with age, and in the age-group 50-59 it reached 71 per cent. The average time for union was 4 weeks in non-septic cases and 7½ weeks in septic cases.

External Pin Fixation for Fractures of the Mandible*

Howlem and others (*Lancet*, 1942:2:391) describe a method for controlling fractures occurring in the mandible behind the tooth-bearing area which method has now been used in 19 cases with excellent results. The principle is to insert a pair of pins into each fragment. The pins are set at angle of 60 degrees to each other, and cross before insertion into the bone. Each pair of pins is attached externally to a metal plate. The two plates—one on either side of the fracture—are joined to a connecting bar by means of universal joints, which allow complete freedom of movement during manipulation. When the fracture has been reduced, the locking nuts on the universal joints are tightened thus giving absolute fixation to the fragments. The pins, which are sharpened to a short bevelled pyramidal point, are 2 inch to 2½ inches (5·6·25 cm.) in length and are made of 1·5 mm. standard Kirschner wire. They are inserted close to the lower margin of the bone, to avoid the inferior dental canal, and penetrate as far as the inner plate. The disadvantage of introducing wire through the skin of the face, with the occasional necessity to treat the residual scars, is more than compensated by the advantage of absolute fixation by extra oral means; oral cleanliness is readily secured with this method, and function at the temporomandibular joint is maintained. Post-operative discomfort is negligible and feeding simplified.

The method at present is in the early stages of elaboration, and its use should be limited to those fractures which cannot be adequately controlled by standard methods.

Amnioplastin for Adherent Digital Flexor Tendons*

Pinkerton (*Lancet*, 1942:1:70) reviews four occasions on which he has used aminoplastin to mobilize flexor tendens which were adherent with the finger. Amnioplastin is prepared from amniotic membrane. The cleaned mebrane is immersed in 70 per cent alcohol and then dried in sheets. When required it is boiled for 20 minutes and washed in sterile saline for about the same time. The final product is thin acellular, transparent and pliable. Amnioplastin has been used with success to prevent adhesions after cerebral injuries, and also as a corneal graft. Disability in a finger following an injury or infection may be threefold in origin. There may be peritendinous adhesions, periarticular adhesions and scarring, or contracture of the superficial tissues. Scarring of the superficial tissues is dealt with by excision of the scar and the application of a full thickness skin graft. Periarticular adhesions present a difficult problem and can be only partially improved by judicious mobilization of the joint. Tendon adherence is satisfactorily remedied by the use of amnioplastin. The author has had the opportunity of seeing the membrane after it had been in position for three months. He found that it was thin, glistening and vascular, and that the tendon moved freely within it. The author gives the case histories of four patients, and states that the results were gratifying. The full thickness skin graft, which is applied to fill the defect left after excision of the scar does not always take throughout. This is because amnioplastin may often form part of the bed, the disadvantage is not serious.

** Abstracts marked with an asterisk are received through courtesy of the British Medical Information Service, 3, Hanover Street, London, W1.*

NOTES AND NEWS

TUBERCULOSIS IN WARTIME

Below is given a summary of the main findings and recommendations of the M.R.C. Committee on Tuberculosis in Wartime. The following are members of the committee: Viscount Dawson of Penn (Chairman), T. Stenner Evans, Prof. Major Greenwood, F. R. G. Heaf, G. Gregory Kayne, Sir Alexander Russell, Miss May Smith, Norman F. Smith, Wing-Cdr. R. R. Trail, Prof. G. S. Wilson, and P. D'Arcy Hart (Secretary).

SUMMARY OF FINDINGS—1. There has been a real increase in deaths from tuberculosis since the beginning of the war. 2. All age groups have been involved to some extent in the increase, and the participants up to the present have not been predominantly young women—as seemed likely early in the war but include, particularly recently, children and the older male age groups as well. 3. Although there has been a slackening in the increase of tuberculosis mortality in the second year of the war, *e.g.*, in young adult females the position is still unfavourable in relation to the pre-war figures. 4. In view of the similar though only temporary, slackening in the rise of tuberculosis at a corresponding time in the last war, together with what is known of the course of tuberculosis, we must be prepared for a further increase as hostilities continue. 5. A disquieting feature of the present position is the increased mortality of children from tuberculous meningitis. Measures have been indicated which should reduce the deaths from bovine infection. To reduce human infection it is necessary not only to take special measures with children, but also to control pulmonary disease in the adult. The suggestions which have been made for the early detection, segregation, and adequate treatment of the tuberculous adult should have an indirect effect in reducing infection among children.

SUMMARY OF RECOMMENDATIONS—*Mass Radiography*—1. Subject to limitations of apparatus, the controlled use of mass radiography before, or as soon as possible after, employment should be extended, especially (a) in the Services, (*b*) among men and particularly women entering the war industries, and (c) among those taking up certain other occupations. 2. A single mass x-ray examination should be carried out, where practicable, upon those already employed in certain industries—*e.g.*, munition factories. 3. As an extension of the preceding, but probably practicable to a much less extent in wartime, x-ray examinations should be repeated at regular intervals upon certain groups of the population, including (*a*) employees in factories which contain large numbers of young adults, (*b*) nurses and medical students, and (*c*) merchant seamen. 4. Where speed and cost dictate, the miniature method is the one of choice for mass radiography. In certain circumstances it may be practicable to make use of existing full-size apparatus. *Institutional Accommodation*—5. Accommodation for institutional treatment of tuberculosis is urgently required. A good deal is now available but cannot be used because of lack of nursing and domestic staffs. Until these staffing problems are solved, no advance can be made in institutional control of the disease. *Financial Provision*—6. In view of the special character of the disease and the prolonged treatment usually required, special financial provision greater than that obtainable under the N.H.I. scheme should be made for persons with tuberculosis. *Rehabilitation*—7. Rehabilitation should be considered an essential part of the treatment of tuberculous persons, and arrangements should be made for the gradual return to industry of such patients on a basis of part-time or modified work. During the period of rehabilitation a supplement to wages should be provided, in order that an adequate standard of living can be maintained by the patient and his family. *Examination of contacts*—8. The examination of all home contacts must be energetically pursued, a first examination being the chief requirement. The re-examination of children under 5 years of age, and of young adults, is highly desirable. *Examination in Special Cases*—9. X-ray examination, and re-examination at intervals, should be undertaken for all cases of pleurisy and erythema nodosum in young people, whether institutional treatment has been given or not. *Mental Hospitals*—10. The special conditions prevailing in mental hospitals make it desirable that an effort should be made as soon as practicable to x-ray periodically all residents of such institutions. *General Working Conditions*—11. It is of the first importance that continued watchfulness should be maintained upon the working conditions of young employees, particularly in regard to hours of work, transport difficulties, rest periods, factory canteens, and hostel arrangements, and their relation to sickness absence. *Milk*—12. The pasteurization of milk should be extended throughout the country, and, where this is not practicable, all milk consumed by children should be boiled, or dried milk should be provided. *Propaganda*—13. The implementing of these recommendations should be accompanied by information and propaganda both to the medical profession and to the general public—*Brit. M. J.*

QUININE PROBLEM

In a malaria-ridden province like Bengal quinine is as essential as food and drink. The problem of the supply of quinine has during recent months assumed gigantic proportions though we have been watching with great anxiety and uneasiness the rapid worsening of the quinine situation in India ever since the outbreak of the present war. The sudden intensification of the quinine problem in India has been in the main brought about by the Allied reverses in the Far East resulting in the removal of Java from the lists of supplier countries in quinine and partly by the hoarding and profiteering mentality of dealers and middle men eagerly bidding their time for a like opportunity. From the record of past consumption we find that about 210,000 lbs. of quinine are required annually to meet the civic needs of which the indigenous production is responsible for only 70,000 lbs., the remaining supplies of 140,000 lbs. being obtained from Java alone prior to its capitulation to the Japanese. Even then the total consumption of 210,000 lbs. falls far short of the real demand of quinine in this country, as much as two-thirds of this demand being left unsatisfied. This unfortunate state of affairs is largely due to the high price of quinine even in times of peace, dictated by the Kina Bureau of Java on the strength of their monopoly of quinine supply and humble acceptance of the same by the Indian producers for want of any Government protection against Javanese dumping. It may be recalled that, in 1939 the Imperial Council of Agricul-

tural Research carried on an investigation to explore the possibilities of increased cultivation of cinchona in Bengal. As a matter of fact, Bengal alone can score a maximum production of 50 to 60 thousand pounds. The report of the investigation, prepared by Mr. Wilson, revealed the existence of sufficient lands in various parts of India, suitable for cinchona cultivation and a promise for future self-sufficiency with regard to quinine supply. But this far-reaching suggestion of the report was neglected by the Government which insisted on the short sighted policy of obtaining an easy supply from Java with the bitter consequences that we are now experiencing. The Government appears to have realised, of late, the importance of quinine problem in India fully in keeping with its old tradition of belated consciouness of Indian problems and have concentrated on the improvement in the methods of cultivation and an extension of acreage under cinchona. We, however, appreciate the Government measure to follow the Russian methods of cultivation, which guarantee substantial yields of quinine from two and half-year old plants. Already about 700 acres of land in Bengal are undergoing this new experiment in the Russain methods of cultivation. Also we note with satisfaction that by introducing a system of rationing of quinine in this province the Government of Bengal has recently decided to control the situation. Furthermore, a five-year rationing scheme has been adopted, whose successful execution it is understood, will effect the distribution of the total stock at the hands of the Central Government together with the annual production of Bengal and Madras all over India for the said period and will make 75 per cent of the past consumption available for each unit of distribution. While some such rationing scheme is doubtless indispensable under the present circumstances, we wish if providence could only temporarily ration the incidence of malaria out of consideration for the people of this wretched province.—*Science & Culture.*

BENGAL MEDICAL RELIEF COMMITTEE

The following is the second list of donors corrected up to 23rd January, 1942.

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(*Continued at the foot of next column*)

CORRESPONDENCE

The Editor is not responsible for any views expressed by contributors—EDITOR.

THE EDITOR, *Journal of the I. M. A.*, Calcutta.

Sir, In my article on 'Lung Abscess' published in your journal in April 1942 (*J.I.M.A.*, 11:185) I referred in the body of the article to the writings of H. Newhof and A.S.W. Touroff. By oversight I did not include the details of the reference in the bibliography. The details are as shown below:

NEWHOLF, HAROLD AND TOUROFF, A. S. W. (1936)—Acute Putrid Abscess of the Lung, *Surg. Gynec., & Obstet,* 63:353

Idem (1938)—Acute Putrid Abscess of the Lung: An Analysis of 45 Consecutive Operative Cases: *Ibid,* 66:836.

I request this to be published in your Journal.

Vizagapatam
15-1-43.

R. Mahadevan, M.S., (MAD.)
F.R.C.S. (ENG. & EDIN).

(*Continued from previous column*)

Dr. M. Sarkar, Campbell Hospital, Calcutta Rs. 10; Dr. B. K. Das Gupta, Campbell Hospital, Calcutta Rs. 10; Dr. P. K. Guha, Campbell Hospital, Calcutta Rs. 14; Dr. S. C. Chandra, Campbell Hospital, Calcutta Rs. 10; Dr. S. C. Bose, Campbell Hospital, Calcutta Rs. 10; Dr. B. P. Sur, Campbell Hospital, Calcutta Rs. 10; Dr. Amalendu Roy, Campbell Hospital, Calcutta Rs. 5; Dr. N. Mukherjee, Campbell Hospital, Calcutta Rs. 5; Dr. B. B. Ghosh, Campbell Hospital, Calcutta Rs. 5; Dr. M. Khabir, Campbell Hospital, Calcutta Rs. 5; Dr. S. Sen Gupta, Campbell Hospital, Calcutta Rs. 10; Dr. K. K. Ghosh, Campbell Hospital, Calcutta Rs. 5; Dr. J. K. Majumdar, Campbell Hospital, Calcutta Rs. 5; Dr. Md. Hossain, Campbell Hospital, Calcutta Rs. 10; Dr. Subodh Mitra, Campbell Hospital, Calcutta Rs. 10; Dr. P. Chatterjee, Campbell Hospital, Calcutta Rs. 10; Dr. R. Sinha, Campbell Hospital, Calcutta Rs. 10. Dr. P. C. Chakraborty, Campbell Hospital, Calcutta Rs. 5; Dr. B. Sinha, Campbell Hospital, Calcutta Rs. 5; The Senior Staff Club of the Campbell Hospital, Calcutta Rs. 265; The Secretary, Azamgarh Branch, I. M. A. Rs. 28-8; Dr. J. W. Phillips, Secretary, Gorakhpur Branch, I. M. A. (in two instalments) Rs. 69; The Secretary, Jubbulpore Medical Association Rs. 78; The Manager, Central Jambad Colliery, P.O. Chora, Dist. Burdwan Rs. 5; The Assistant Secretary, Bhagalpur Medical Association Rs. 25; Total Rs. 2275-12. Amount as per first list of donors (published in the January 1943 issue, page 137.) Rs. 1,917. Grand total Rs. 4,192-12.

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The following is the second list of medicines received from:

1. Bengal Immunity Co. Ltd., Calcutta 200 amps. Cholera-phage and 200 amps. Typhoidphage.

2. The Standard Pharmaceutical Works, Ltd., Calcutta 2×42 ampoules Typhoid and Cholera Vaccines (no Para. A & B) (B. typhosus 500 millions, V. cholera 8000 millions); 100 ampoules Bacteriophage Dysentery; 100 ampoules Bacteriophage Dycase; 7×2 oz. Chlorodyne; 12×2 oz. Livergen and 14×2 oz. Riosol with Opii.

3. The Director of Public Health, Bengal 24 boxes of medicines for 12 Medical Units, 12 boxes of medicines for 3 Medical Units. Total 36 boxes.